



2017-2018

1.7 Rational Zeros Theorem, Finding Rational Zeros, Upper & Lower Bounds, Descartes's Rule of Signs

Name _____ Date _____ Period _____

Use the Rational Zeros Theorem to write a list of all potential rational zeros.

1. $f(x) = 6x^3 - 5x - 1$

2. $f(x) = 2x^3 - x^2 - 9x + 9$

Use the Rational Zeros Theorem to write a list of all potential rational zeros. Then determine which ones, if any, are zeros. Show your work on a separate piece of paper.

3. $f(x) = 3x^3 - 7x^2 + 6x - 14$

4. $f(x) = 6x^4 - x^3 - 6x^2 - x - 12$

Use synthetic division to see if the number k is an upper or lower bound for the real zeros of $f(x)$ and state why it is an upper or lower bound.

5. $k = 0; f(x) = x^3 - 4x^2 + 7x - 2$

6. $k = 2; f(x) = x^4 - x^3 + x^2 + x - 12$

7. $k = -1; f(x) = 3x^3 - 4x^2 + x + 3$

8. $k = 3; f(x) = 2x^3 - 4x^2 + x - 2$

Use Descartes's Rule of Signs to determine the possible number of positive and negative real zeros of the function.

9. $P(x) = 9x^3 - 4x^2 + 10$

10. $P(x) = 8x^3 + 2x^2 - 14x + 5$

11. $f(x) = x^3 + x^2 - x + 1$

12. $f(x) = 5x^4 + x^2 - 3x - 2$

13. $f(x) = 2x^3 + x - 3$

14. $f(x) = x^3 + x^2 + x + 1$

Find all of the real zeros of the function, finding exact values whenever possible. Identify each zero as rational or irrational.

15. $f(x) = 2x^3 - 3x^2 - 4x + 6$

16. $f(x) = x^3 + 3x^2 - 3x - 9$

17. $f(x) = x^3 + x^2 - 8x - 6$

18. $f(x) = x^4 - 3x^3 - 6x^2 + 6x + 8$

Divide using long division.

19. $(9x^3 + 5x - 8) \div (3x - 2)$

Without using technology, sketch each polynomial. (Hint: Identify the zeros, their multiplicity, determine whether they touch or cross the x -axis at each zero and describe their end behavior.)

20. $f(x) = x^2(4x + 3)^2$

Zeros	Multiplicity	Touch/Cross

$$\lim_{x \rightarrow -\infty} f(x) =$$

$$\lim_{x \rightarrow \infty} f(x) =$$

